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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/665,148	09/22/2003	Shinya Yamasaki	Q77313	5798

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SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER

MACARTHUR, SYLVIA

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 07/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/665,148

Applicant(s)

YAMASAKI ET AL.

Examiner

Sylvia R MacArthur

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address.

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 3/11/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Melissa Patrick on 7/15/04.

The application has been amended as follows:

Claims 48 and 49 are cancelled.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-6 and 14-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Rolfson (US 6,255,228).

Rolfson teaches a method for removing contaminants from a semiconductor wafer.

Regarding claim 1: Rolfson teaches an etching apparatus comprising a rotating means (spin chuck 12) for holding a semiconductor wafer and for rotating said wafer in a horizontal plane; wafer 10 having a device area and surface peripheral area on its surface; said surface peripheral

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area being located outside said device area; and an edge 21a nozzle for emitting an etching liquid toward a surface peripheral area of said wafer; wherein said etching liquid emitted from the edge nozzle selectively etches out an unnecessary material existing in said surface peripheral area of said wafer.

Regarding claim 2: Rolfson teaches an etching liquid emitted from an edge nozzle has an emission direction oriented along a rotation direction of said wafer or outward with respect to an tangent of said wafer formed near a contact point of said liquid with said surface peripheral area of said wafer.

Regarding claim 3: Rolfson's teachings further comprise a back nozzle 21b for emitting an etching liquid toward a back center of the wafer; wherein the etching liquid emitted from the back nozzle etches out an unnecessary material existing on a back of said wafer.

Regarding claim 4: Rolfson teaches a surface nozzle 16 capable of emitting a protecting liquid toward a surface center of said wafer; wherein said protecting liquid emitted from the surface nozzle covers the device area of wafer to protect the same against said etching liquid emitted from the edge nozzle.

Regarding claim 5: Rolfson teaches a back nozzle 21b for emitting an etching liquid toward a back center of the wafer and a surface nozzle for emitting protecting liquid toward a surface center of the wafer and a surface nozzle for emitting protecting liquid toward a surface center of

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said wafer; wherein said etching liquid emitted from the back nozzle covers the device area of the wafer to protect the same against the etching liquid emitted from the edge nozzle.

Regarding claim 6: The etching liquid is emitted from a beam-shaped edge nozzle, see Fig. 1 of Rolfson.

Regarding claim 14: Rolfson teaches a cleaning apparatus comprising a) a rotating means (spin chuck 14) holding and rotating the wafer b) an edge nozzle 21a emitting a cleaning liquid toward a surface peripheral area of the wafer

Regarding claim 15: Rolfson illustrates in Fig.1 that the cleaning liquid emitted from the edge nozzle has an emission direction oriented along a rotation direction of the wafer or outward with respect to a tangent of the wafer formed near a contact point of the liquid with the surface peripheral area of the wafer.

Regarding claim 16: The apparatus of Rolfson further comprises a back nozzle 21b for emitting a cleaning liquid toward a back center of the wafer. The cleaning liquid emitting from the back nozzle removes unnecessary material existing on the back of the wafer.

Regarding claim 17: The apparatus of Rolfson further comprises a surface nozzle 16 capable of emitting a protecting liquid toward a center of the wafer. Wherein the protecting liquid protects the wafer against cleaning liquid emitted from the edge nozzle.

Regarding claim 18: The apparatus of Rolfson comprises a back nozzle 21b emitting a cleaning liquid toward a back center of the wafer and a surface nozzle 16 capable of emitting protecting liquid toward a surface center of the wafer; wherein the cleaning liquid is emitted from the back nozzle etches out unnecessary material on back of the wafer and the protecting liquid emitted from the surface nozzle covers the device area of wafer to protect the same against cleaning liquid emitted from the edge nozzle.

Regarding claim 19: The cleaning liquid is emitted from a beam-shaped edge nozzle, see Fig.1 of Rolfson.

Regarding claim 24: The distance of an end of the edge nozzle from a point where a longitudinal axis of the edge nozzle intersects the surface of the wafer is set within a range of 1-50mm, and the angle of the edge nozzle with respect to a tangent of the wafer is set as a value in the range of 0-90 degrees.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. Claims 11, 12 and 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rolfson.

The teachings of Rolfson were discussed above.

Rolfson fails to teach the specific distance of the wafer to the nozzle and the angle of the edge nozzle/back nozzle.

However, Rolfson illustrates the edge nozzle at a 90 angle to the wafer and the back nozzle at an angle less than 90 degree. According to *In Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device. The angle of the nozzle to the wafer and the distance from the nozzles to the wafer are optimizable parameters. The motivation to provide the angle and distance at the disclosed dimensions is that these dimensions would provide the desired semiconductor manufacturing product.

Thus, it would have been obvious for one of ordinary skill at the time of the claimed invention to provide the angle and distance of the nozzles of Rolfson with respect to the wafer at the disclosed dimensions.

6. Claims 7 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rolfson in view of Sellmer et al (US 6,494,221).

The teachings of Rolfson were discussed above.

Rolfson fails to teach a roller-chucking type.

Sellmer et al teaches rollers that contact the edges of the wafer and support it during processing. The motivation to provide a roller-chucking type is that it provides enhanced support for the wafer.

It would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide rotating means that is of the roller-chucking type

7. Claims 8-10 and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rolfson in view of Wada et al (US 5,879,576).

The teachings of Rolfson were discussed above.

Rolfson fails to teach that the rotating means is of the pin-chucking type.

Wada et al teaches a method and apparatus for processing substrates. Wada teaches a substrates rotating means 11 having a plurality of support studs (pins) 17 and a plurality of positioning studs (pins)18. Fig.1 illustrates that these two types of pins alternately contact the end face of the wafer The motivation to provide the two sets of pins is that the first set of pins 17 promote horizontal support for the wafer while the two set of pins ensure that movement in the horizontal direction is restricted.


Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide a pin-chucking support as the rotating means in th eappratus of Rolfson to enhance the substrate support.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sylvia R MacArthur whose telephone number is 571-272-1438. The examiner can normally be reached on M-F during the core hours of 8 a.m. and 2 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory L. Mills can be reached on 703-308-1633. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Sylvia R MacArthur
Patent Examiner
Art Unit 1763

July 16, 2004